INSPECTION AND SAFETY DIVISION
OPERATIONS SERVICES DEPARTMENT

Evaluation

of

World Trade Center

Construction S. .ety Program

For The Period
June 1 - September 1, 1969

Project Engineers: Richard Twiss
Joseph Licurse

Project Supervisor: William M. Connell

PLAINTIFF'S EXHIBIT PX-528

EXHIBIT

GENERAL REVIEW

Fire remains the greatest exposure to this project, particularly in the below grade areas. The installation of both temporary and permanent fire protection systems has improved during the current period. Close liaison with local New York City Fire Department units by World Trade Safety Staff continues. The value of the portable extinguishing equipment installed under the fire protection program is amply demonstrated by the many incipient daily fires extinguished with it. Only the continued, maintenance of portable equipment, training of personnel and timely installations of standpipe equipment will give reasonable assurance of preventing a serious fire occurrence.

Cumulative safety statistics for the project indicate a favorable overall experience; however, recent contractor employee accident experience indicates a definite need for a renewed effort in that area of safety. While many of the disabling injuries to contractor employees are relatively minor, as evidenced by the moderate number of patients being transported to Beekman Hospital, increased disabling injury frequency rates signal the need for increase attention to worker safety. World Trade staff began to intensify its efforts in this area subsequent to our last audit report. July's experience showed definite improvement as a result. It is important that this improvement continue. It can be done only with the active participation of World Trade Center staff, the general contractor, individual contractors and union officials.

Steel erection is progressing in both towers. Tower B cranes have been tested and are now making full production lifts. A sound program for safe lifting and crane coordination has been promulgated by World Trade Staff, but the steel erection contractor's safety program has yet to be implemented. As indicated in previous reports on this project, the effective application of these safety programs is absolutely essential for the operating safety of all lifting equipment on the site. The ever increasing flow of materials being delivered into the construction area, resulting in the installation of a variety of types of lifting equipment, continues to accelerate the critical need for sound controls over all lifting equipment and procedures.

We continue to categorize overall safety on this project as excellent.

ACCIDENT DATA

Disabling Injury Rates

The project's overall disabling injury rate of 20.15 (1971) remains favorable in comparison with both the New York State Department of Labor Rate, 24.3 and the National Safety Council's General Building Construction Rate of 18.3.

Contractor Disabling Injury frequency rates for six months are indicated below:

February	1969	16.05
March	1969	28.93
April	1969	30.44
May	1969	26.3
June	1969	48.60
July	1969	15.29
August	1969	15.36

As indicated in our previous report, the increasing numbers of new contractors employees contributed to a statistical increase in injury rates. Current safety promotion and enforcement procedures by safety and construction inspection staff appear to be reversing the higher trend. Preliminary August figures indicate a rate for that month comparable to that of July.

Accidents

Compensation claims from 4-1-69 to 7-1-69 - 420
2-15-66 to 7-1-69 - 2397

	Bodily Injury	Property Damage
Liability claims from 3-1-69 to 7-1-69	12	5
2-15-66 to 7-1-69	101	145

SAFETY PROGRAMS AND TRAINING

Construction Meetings

Periodic Meetings continue to be held between contractors personnel and World Trade Center representatives to discuss current safety problems or hazards pertinent to contractors operations. Present plans contemplate that a representative of the New York City Fire Department will be invited to speak at one of these meetings, to explain fire department rules and regulations on pertinent operations.

Contractor Employee Meetings

Otis Elevator Co., Nager Electric Co. and Sand-Courter are holding weekly safety meetings for their employees. It is absolutely essential that the major contractors show similar interest in the safety of their work force, in order to produce a marked reduction in first aid cases and disabling injuries. It is recommended that all possible pressure be brought to bear on the lax contractors to hold regular safety meetings with their employees and to highlight hazards pertinent to their operations. To this end, experienced W.T.C. safety personnel could offer their services to assist in the initial set-up of the desired safety meetings. These The need for these meetings have been repeatedly brought up at contractors coordination meetings held by the General Contractor. Further efforts will be made to obtain [illegible] contractor participation in this program.

Contractors Safety Programs

These programs established by the contractors themselves are an essential part of each contract. They spell out in detail what can be expected from a contractor in the area of safety performance. The principal contractors have submitted safety programs that have been approved by World Trade Construction Staff. During this report period, pre-construction safety conferences have been held with ALCOA and associated sub-contractors.

M 007939

HD00012157

Of the major contractors with approved safety program, two have been conspicuous by their absence. Karl Koch and Dic Underhill have both submitted programs unacceptable to World Trade Safety Staff.

The Koch program after considerable updated review has been returned to Koch through Tishman for promulgation. The Dic Underhill program in its unsatisfactory form is under World Trade review and discussion. Since both of these contractors have been actively operating for a considerable period, it is increasingly critical that World Trade Management press for the submission and prompt implementation of safety programs by both of these contractors.

Safety Meetings

The program of regular weekly safety meetings with Port Authority construction inspectors continues. The main theme of the current meetings has been accident analysis and recommendations for individual contractors. Films and speakers have been used to highlight this subject. These meetings have, as considered by injury rate improvements in the last 60 days, been apparently well received and implemented by the construction inspectors.

Emergency Catastrophe Plan

An improved telephone emergency reporting system has not yet been installed to replace the present unreliable system. It is again recommended that some form of alerting device, such as an airhorn or siren be provided to be used for general emergency and evacuation purposes. This recommendation was previously agreed to but never implemented.

As indicated in our previous audit, it is essential that knowledgeable and qualified personnel be provided during off hours to assure that emergency services, such as power control, emergency lighting and elevator services are available. These personnel should be under the control of a responsible Port Authority employee.

Above-Grade Fire Protection Plan

The Above-Grade Fire Protection Program was promulgated on July 18, 1969, and is subject of appendix (A).

Safety Awards Program

A Safety Awards Program drawing was held on August 12. Over 300 workers attended. The lack of elevator transportation due to a strike prevented attendance by employees in the upper tower.

Poster Program

Banner type safety posters have recently been renewed throughout the construction site. These have been supplemented by the small sticker type safety slogans within the tower areas, and at key locations around the site.

HAZARD IDENTIFICATION AND CONTROL

BLASTING

Blasting operations have been safely completed adjacent to the PATH Tubes. Light intermittent blasting continues for buttress wall construction.

SAFETY ENGINEERING INSPECTIONS

Field inspections by World Trade Center Safety Staff, the Insurance carriers and Inspection & Safety continue on a daily basis. The Port Authority Insurance Division is currently conducting a weekly inspection tour of the site. These activities result in close surveillance and the prompt reporting of unsafe acts and conditions. World Trade Center Safety staff gives prompt attention to exposures and requests corrective action from the General Contractor by memoranda, or where deemed necessary, by telegrams to the contractors.

Periodic meetings have been established to coordinate the efforts of all these inspection groups. As a result of the first of these meetings, a frequently repeated request for sidewalk repairs by the liability carrier will now be executed, and the acquisition of title to parts of Cortlandt and Greenwich Street will now permit barricading and the limiting of pedestrian traffic to designated walkways.

FLOOR OPENINGS

There has been a definite improvement in the installation, repair or replacement of handrails and barricades. This is an area that requires constant surveillance, and prompt attention by the General Contractor. Some areas of the perimeter wall fencing have been damaged due to construction activities, and undue delay has been experienced in the replacement. An increase in the work force for this repair work should be provided by the General Contractor to alleviate the situation.

PEDESTRIAN CONTROL

Pedestrian control by the guards is good. Bi-weekly meetings continue between W.T.C. Safety staff and Callahan Guard Service to assess current requirements for pedestrian guard patrols.

M007941

TEMPORARY ELECTRIC POWER

With the rapid expansion of various stages of construction, the need for temporary lighting in the below grade areas and in Tower A has increased. To provide these needs, the electrical contractor has recently assigned a foreman with a crew, exclusively to temporary lighting. This action should help to alleviate the lighting problems.

The electrical installations with respect to workmanship and code compliance have greatly improved over early stages of construction. In the past, deficiencies involving overheated cables and the use of copper alloy connectors was a major concern, however, the contractor has initiated a program and substantially eliminated these conditions.

During construction, constant surveillance of the electrical installation should be made to assure that welding leads, welding grounds, proper wiring methods and circuit protection comply with code requirements for buildings under construction. Constant surveillance inspection will be maintained by W.T. electrical

HD00012159

STEEL ERECTION

A steel erection program covering all types of lifting equipment and pertinent operations has been promulgated. The original steel erection program has been revised to meet the actual contingencies of present field operations, and is the subject of appendix (B). The daily enforcement of this program will effectively control the steel erection operation and reduce the potential for accidents. The most critical requirement for immediate implementation is the tower guide system to assure that steel members are lifted with proper sway control.

Karl Koch's safety program has been a subject of much concern by W.T.C. staff. Programs submitted by this contractor were too limited in their scope, and revisions were incorporated to cover the essentials, outlined in the W.T.C. program for "Steel Erection". Included with these revisions were requirements for the safe jumping operations of tower cranes and the testing and servicing of all equipment. The Koch program has been returned for promulgation. Koch must now give immediate attention to the engineering of the Tower guide system and the acquisition and installation of anemometers and aircraft warning lights. The fall of a 3' x 40' section of improperly secured corrugated steel decking during lifting operation from approximately the 546 elevation level, highlights the need for implementing and enforcing the steel erection program provisions.

Aircraft warning lights have been installed and are operational. Koch has again been directed to install a recording anemometer.

The increase in the amount of materials being delivered to the site has resulted in the installation of different types of hoisting equipment. The World Trade Center crane and hoist inspector has drawn up a list of "General requirements for all hoisting equipment" (Appendix C), which will be submitted to all contractors, for their guidance and will effectively control the installation and operation of this type of equipment.

Inspection Program

Daily surveillance of all crane operations is carried out by the W.T.C. crane and hoist inspector. This daily program is very comprehensive in its detail and scope.

Equipment

Lifting apparatus at the construction site is divided into three categories as follows:

(1) Koch Climbing Cranes

The eight tower cranes have been tested in accordance with World Trade Center consultant specifications, under the observation of the W.T.C. Safety staff. The tests consisted of lifting and swinging a load of approximately 54 tons at a measured radius of 76 ft. and holding it for 30 minutes, followed by a lift of 39 tons at a measured radius of 95 ft. These tests were satisfactory. The crane safety devices consisting of main hoist and whip line automatic cutouts and boom stop and automatic limit switches were also subjected to tests. Cab gages are now calibrated in tons, and not as formerly in pounds per square inch. Load radius charts, approved by W.T.C. consultant are provided for each operator. These charts also designate possible work danger areas of adjacent cranes. Lifts in excess of test tonnages will be individually engineered by World Trade Staff.

M007942

HD00012160

The continuous safe operation of these cranes will now depend largely on the service and maintenance programs. Those programs will be evaluated by the crane and hoist inspector.

To assure correct crane stability, the jumping of tower cranes must be observed by W.T. Safety staff, and a running log should be maintained of the inspection procedures following the jump. Although Koch has been advised to provide 24-hour notice of these jump operations, he apparently ignored this requirement on July 2nd and July 22nd. ~~[illegible]~~ presently being [illegible] by the P-A- Crane and Hoist Inspector. Comments concerning any problems during jumping are kept documented by [illegible].

(2) Mobile Equipment

All mobile lifting equipment is subjected to an inspection prior to being allowed to work on the construction site, and then is a subject of the daily inspection tour by the crane and hoist inspector.

(3) Miscellaneous Hoisting Equipment

General regulations based on New York State requirements were submitted to all contractors. Compliance with these regulations will result in safe operating procedures. It is recommended that the general contractor strictly control the locations for the installation of hoisting equipment, and the use of such equipment, unless approved by World Trade Center crane and hoist inspector. The general contractor has been informed of these responsibilities and states that he is providing the necessary controls.

Crane Operators

All operators currently hold valid certificates of competency issued by the New York State Industrial Commissioner.

Steel Erection Platform

The steel erection platform at Tower A has been completed. There has been a marked improvement in eliminating the exposure from falling objects on this platform. Signs, indicating safe access and egress routes to the Tower A have been posted. The completion of more of the 310 formwork has relieved some of the earlier congestion around the steel erection platform. Improved access to Tower A obviously results in a large increase of delivery vehicles. It is recommended that the General Contractor provide designated personnel to strictly control the movement and positioning of vehicles on the steel erection platform at all times. Tishman has a man assigned to the steel erection platform for purpose of ~~[illegible]~~ control of vehicles

I not TRCC to put such a man on payroll. I had authorized it

FIRE PROTECTION

The World Trade Center fire inspector makes complete daily inspections of the construction site, supplemented by off-hour tours. He has been responsible for implementing all phases of the Below-Grade Fire Protection Program and has established a good working relationship with local fire department companies primarily responsible for response to the site.

Fire protection, below grade, has been made flexible, by the stretching of hose lines from charged standpipes into the critical fire areas for immediate use. This flexibility has been the basis of protection in the below grade areas.

On two recent occasions, incipient fires have been promptly extinguished as a result of the timely, implementation of fire protection planning for this project. A serious fire of undetermined origin on Pier 13 was promptly extinguished by World Trade Safety Staff, and a smokey rubbish fire on the 20th floor of Tower A was doused by watchmen using installed extinguishers. In both cases, the good fire planning, watch services, radio communication and the proper allocation of fire fighting equipment paid untold dividends.

Fire Extinguishers

Fire extinguishers recently purchased by the World Trade Center are considered to be adequate for the present coverage. However, it has been noticed that contractors have been negligent in providing fire extinguishers on concrete buggies, portable power equipment, hoisting engines and for their burning and cutting operations.

The World Trade Center Fire Inspector has had to contend with the deliberate discharge of the wheeled type extinguishers for no apparent reason. To date, six of these units have been recharged. There has been pilferage of hose, connectors, and nozzles which has reduced the efficiency of the fire protection coverage, and consumed too much of the fire inspector's time in re-arranging and replacing equipment.

It is suggested that W.T.C. staff publicize and use every persuasion at their disposal, to influence top union officials to assist in the correction of this pilferage problem. Fire protection equipment on the site is installed primarily for the protection of life, and the equipment should be maintained ready for use at all times.

Fire Standpipe System

The installation of the second wet temporary standpipe has been completed. The completion of the first two temporary standpipes in the below grade area provides first aid fire equipment in the most critical areas at this time and is considered adquate for the present exposures.

The permanent tower standpipe system, in Tower A is supplied from the No. 1 temporary standpipe and has been installed from the 310 to the 242 Level, and from the 310 to the 20th floor elevation at riser No. 2. Temporary three inch piping, which was installed from the seventh floor up, on riser No. 3, has been replaced with a permanent six inch standpipe riser. At the present time, riser No. 1, is blanked off at the seventh floor level pending delivery and installation of motorized valves.

Domestic water pumps, located at the 294 Level, have recently been activated, and can now supply water to fill 55 gallon drums on all floors up to the 19th floor elevation.

Fire Watch Service

Callahan guard service has provided fire watch coverage in the below grade areas of Towers A and B on a twenty-four hour basis. A program of fire watch training is underway, and there is a marked improvement in the regular firewatchers' attitudes and approaches to their duties.

Experience has shown, however, that the type of individuals supplied by Callahan for this firewatch has not generally been satisfactory. With reference to the guard service contracts, it is recommended that the contractor be required to provide better qualified personnel for the more exacting duties of firewatching. Very few of the present firewatch personnel have been qualified by the New York City Fire Department.

Karl Koch, steel erectors, have not yet provided firewatchers for their burning and welding operations. However, World Trade safety staff has provided four additional Callahan firewatches to police this operation.

World Trade Center Safety Staff still continue the excellent practice of providing a complete firewatch tour of the construction site during the most critical hours of 4 P.M. and 6 P.M. at the completion of each work day.

Fire Alarm and Communication Service

As previously stated, an improved telephone emergency reporting system is still on order by World Trade Center Engineering staff. Every effort should be made to have the New York Telephone Co. install this new system as soon as possible.

World Trade Center Engineering staff and the General Contractor provide good radio coverage during the working hours. Two-way radios are now carried by W.T.C. safety staff and key construction Inspectors. The general contractors field personnel supplement this radio coverage.

At the insistence of and with the help of W.T.C. safety staff, Callahan Guard Service established a guard shack on Greenwich Street for the monitoring of radio calls. A log book is maintained to record all calls on a 24-hour basis from the construction site, and the five guards, provided with two-way radios in Tower A and the below grade areas are required to report conditions at 30 minute intervals.

It is again recommended that Callahan Guard Service provide their guards with 5 watt portable units to replace the 1½ watt units, presently provided. The lower powered units are ineffective in some areas of the site. This ineffectiveness will undoubtably increase with the covering of below grade areas.

Sprinkler Protection for PATH Tubes

M007945

The sprinkler installation for the North PATH Tube has been completed, is operational.

The sprinkler protection on the South Tube has progressed to a point where the piping installation has been completed except for the final connection into the city water supply on Greenwich Street. This system is operational by utilizing the siamese fire department connections on the east and west ends of the system.

Pest Control

Extermination work commenced in July under contract PSE-81, "Furnishing of Extermination Service, World Trade Center." Contract, PSE-81 was written by Environmental Sanitation Section of the Inspection & Safety Division. All work performed is under their supervision. Prior to commencement of work, a rodent survey was conducted by personnel from the Inspection & Safety Division. All areas determined to be rodent infested would be treated by the most appropriate rodent extermination efforts.

A newly developed rodenticide, trade named "Raticate", is being used at the World Trade Center Site. This marks the first time that this chemical is used in the Port Authority. This compound, in the quantities used, is specifically for the Norway Rat, the species infesting the premises. In this manner a rodent free environment will be created for all concerned.

GENERAL SAFETY ITEMS

Liaison with the New York City Fire Dept.

Cooperation between the New York City Fire Department and World Trade Center Safety staff remains good. The W.T.C. fire inspector provides current construction information, pertinent to fire department operations to the district chief on a weekly basis. The inspector is also present at the fire department drills, held on a weekly basis, to supply the line officers with information and to receive their comments on the protection of fire exposures.

Copies of fire department response procedures and site evaluation form Appendix (D).

Hard Hats

There has been a combined effort by World Trade Center and union officials to achieve 100% compliance with this basic safety requirement. Improvement has been noted and surveys indicate approximately 2% of the working force, principally lathers, are disregarding the hard hat rule.

Eye Protection

Karl Koch (Steel Erector) has in the past had the highest number of accidents; the greater percentage of which are eye injuries. Proper Eye protection has been provided by this contractor since June and there has been a noticeable decrease in this type of injury.

Alcoholic Beverages

The consuming of alcoholic beverages still continues on the site, despite the repeated efforts of World Trade Center staff. Signs are being posted throughout the site forbidding consumption of alcohol and further instructions are being sent to the contractors. The effort is to attempt a reasonable control of this problem.

Asbestos Exposure

Mario and De Dono, the contractors who will spray fireproofing on the exposed steel structural members of the foundations and towers commenced work operations in August. At the pre-construction meeting with the contractor particular emphasis was placed on the control of asbestos dust that is present during the sprayon operations. Respirator protection will be provided for those involved in the spray operation and the spray residue will be kept within the confines of the work area. The World Trade Safety Staff intends to have periodic air samplings taken and analyzed to assure that the contractor presents no hazardous conditions to employees or other workers on the site.

Compressed Gas Cylinders

World Trade Center safety staff have recently completed a survey of the number and type of compressed gas cylinders within the site area. The storage and use of these cylinders has not met minimum required standards.

A concerted effort is being made to control this problem by (1) enforcing the speedy return of empty cylinders, (2) tagging with contractors name to identify the user, and direction by memoranda to the contractors for compliance with fire department regulations.